

WHAT IS CLAIMED:

1. A method of removing oxide from a crack in a substrate, the method comprising:

applying a slurry paste comprising a fluoride salt to the crack;

heating the slurry paste and the crack to at least a melting point of the fluoride salt to form a reaction product; and

removing the reaction product.
2. The method of claim 1, wherein the fluoride salt includes potassium tetrafluoroaluminate and potassium tetrafluoroborate.
3. The method of claim 1, further comprising before said heating the slurry paste, drying the slurry paste.
4. The method of claim 1, further comprising after said apply the slurry paste, penetrating the slurry paste into the crack.
5. The method of claim 4, wherein said penetrating includes:

cycling the crack through a vacuum so as to cause trapped air to leave the crack; and

exposing the crack to atmospheric pressure.
6. The method of claim 1, wherein said removing the reaction product is by immersing the crack in a water bath.
7. The method of claim 1, wherein said heating the slurry paste and the crack is done in an inert atmosphere.
8. The method of claim 7, wherein the inert atmosphere includes argon and vacuum.

9. The method of claim 1, wherein the reaction product includes dissolved oxide.

10. The method of claim 1, wherein the reaction product includes a chemical reaction between the slurry paste and the oxide.

11. The method of claim 1, wherein the substrate is a gas turbine airfoil.

12. A gas turbine airfoil including a crack treated by the method of claim 1.

13. A method of removing oxide from a crack in a substrate, the method comprising:

reacting oxide in the crack by a molten fluoride salt to form a reaction product;
and

immersing the crack in a water bath to remove oxide.

14. The method of claim 13, wherein said dissolving includes:

applying a slurry paste of a fluoride salt to the crack;

heating the slurry paste and the crack to at least a melting point of the fluoride salt so that the slurry paste reacts with the oxide material into a reaction product.

15. The method of claim 13, wherein the fluoride salt includes potassium tetrafluoroaluminate and potassium tetrafluoroborate.

16. The method of claim 14, further comprising before said heating the slurry paste, drying the slurry paste.

17. The method of claim 14, further comprising after said apply the slurry paste, penetrating the slurry paste into the crack.

18. The method of claim 17, wherein said penetrating includes:

cycling the crack through a vacuum so as to cause trapped air to leave the crack; and

exposing the crack to atmospheric pressure.

19. The method of claim 14, wherein said heating the slurry paste and the crack is done in an inert atmosphere.

20. The method of claim 19, wherein the inert atmosphere includes argon and vacuum.

21. The method of claim 13, wherein the substrate is a gas turbine airfoil.

22. A method of removing oxide from a crack in a substrate, the method comprising:

applying a slurry paste to the crack, wherein the slurry paste comprises a fluoride salt;

applying a vacuum to the crack;

heating the slurry paste and the crack to at least a melting point of the fluoride salt to form a reaction product; and

removing the reaction product.

23. The method of claim 22, further comprising, after the applying the vacuum to the crack, exposing the crack to atmospheric pressure.

24. The method of claim 22, wherein said removing the reaction product is by immersing the crack in a water bath.

25. The method of claim 22, wherein said heating the slurry paste and the crack is done in an inert atmosphere.